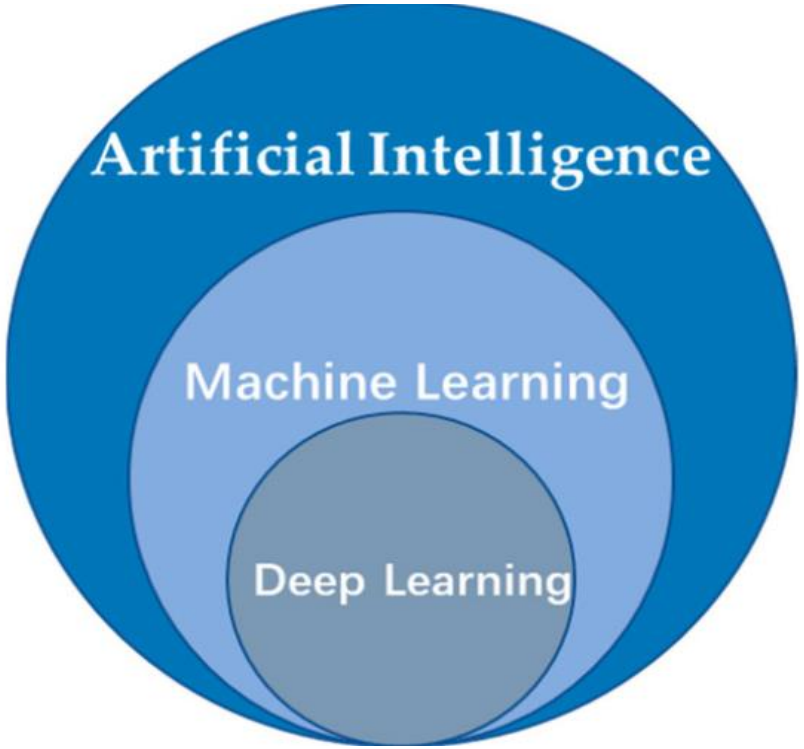
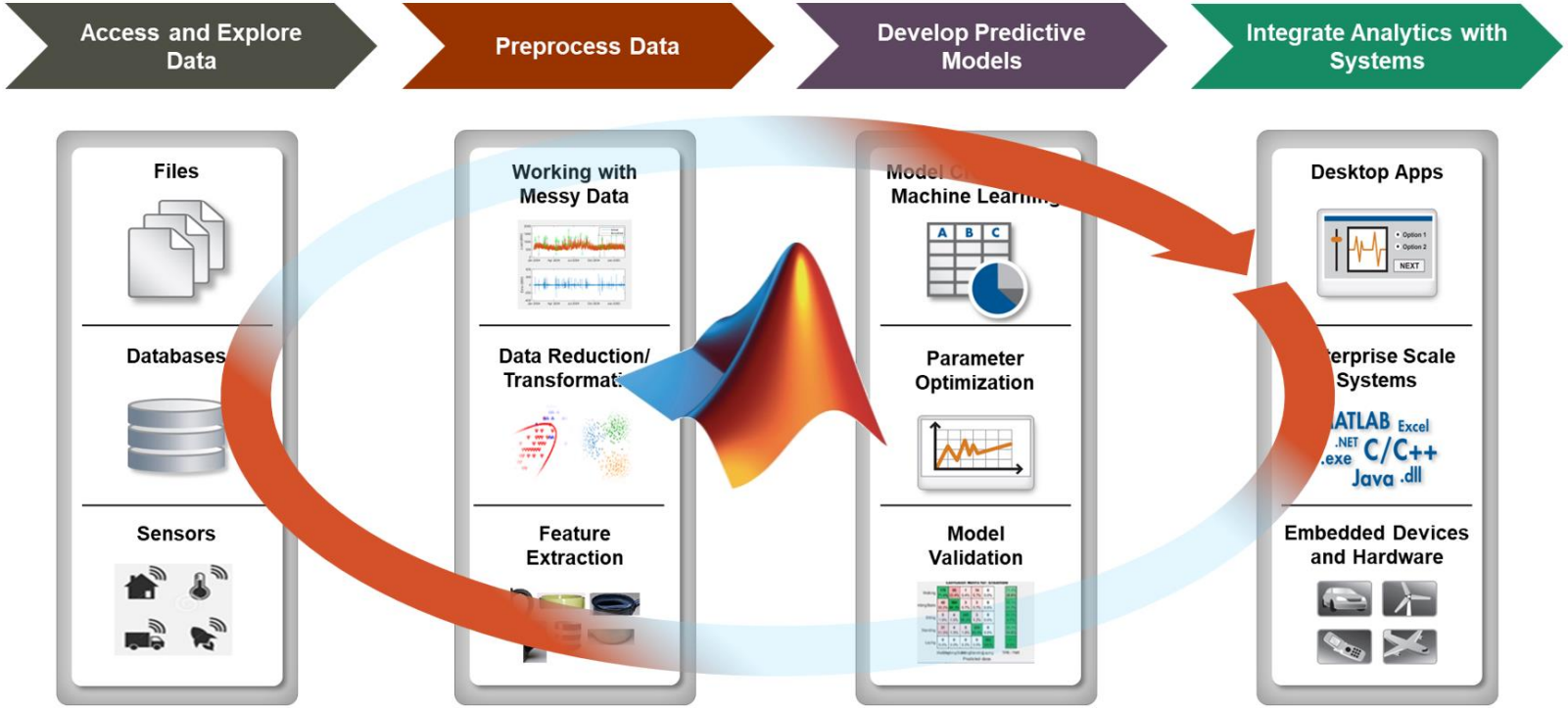


Control Tech LAB

AI with MATLAB&Simulink



Asst. Prof. Claudia F. YAŞAR YTU Control and Automation Engineering Department-2024

Working with:

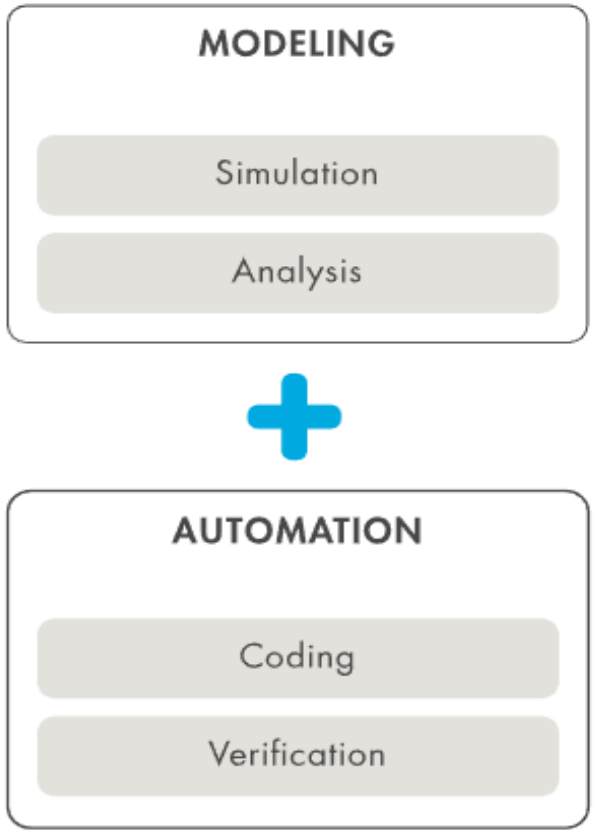
1. Introduction Presentation 2
2. Introduction System Modeling (A live Script)
3. Computational thinking tools (presentation shared with a MATLAB Driver link)

Simulink is for Model-Based Design

From Concept to Operation

To transform development of complex systems, market-leading companies adopt Model-Based Design by systematically using models throughout the entire process.

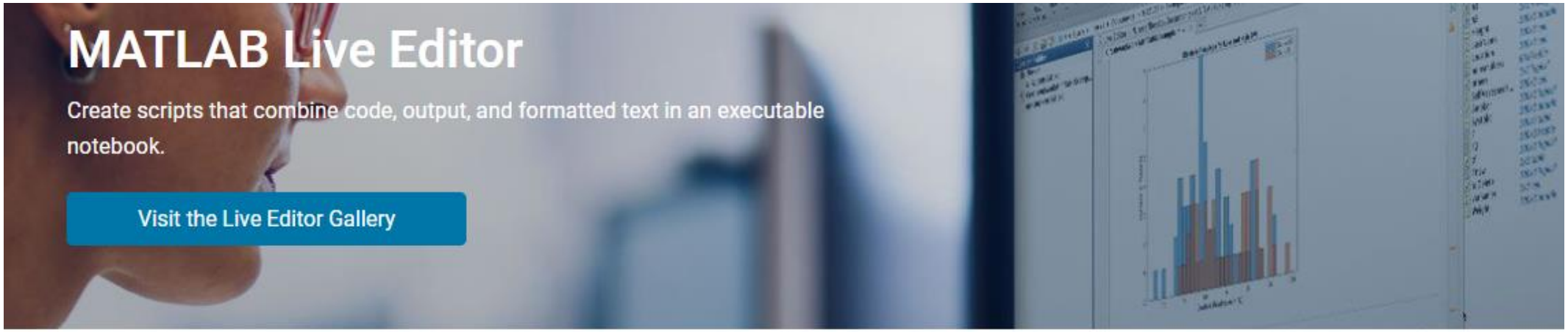
- Use a virtual model to simulate and test your system early and often
- Validate your design with physical models, Hardware-in-the-Loop testing, and rapid prototyping
- Generate production-quality C, C++, CUDA, PLC, Verilog, and VHDL code and deploy directly to your embedded system
- Maintain a digital thread with traceability through requirements, system architecture, component design, code and tests
- Extend models to systems in operation to perform predictive maintenance and fault analysis



Try out **new** ideas.
Fast **repeatable** tests.

Eliminate **manual steps** and reduce **human error**.

https://www.mathworks.com/solutions/model-based-design.html

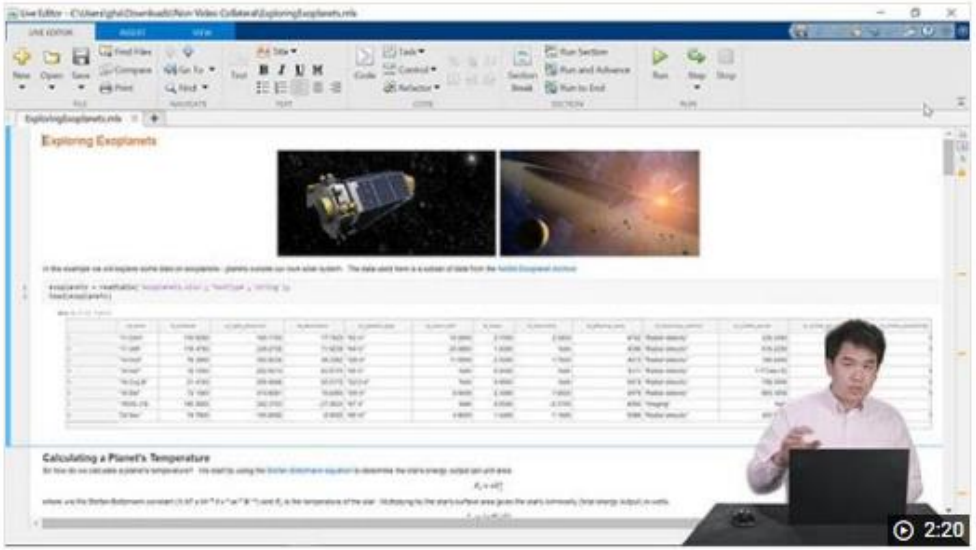


Create an Executable Notebook

Create scripts that combine code, output, and formatted text. Divide code into manageable sections that can be run independently. View output and visualizations next to the code that produced them. Enhance your code and results with formatted text, headings, images, and hyperlinks. Insert equations using the interactive editor or create them using LaTeX. Save code, results, and formatted text in a single executable document.

You can use the Live Editor in MATLAB® and in MATLAB Online™.

Try it: Can you find the exoplanet furthest from the earth?



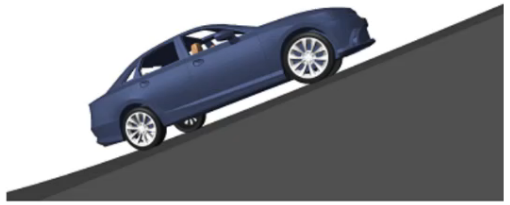
What Is the Live Editor?

https://www.mathworks.com/products/matlab/live-editor.html?s_eid=PSM_15028

Real-Time Simulation with a Laptop or Desktop

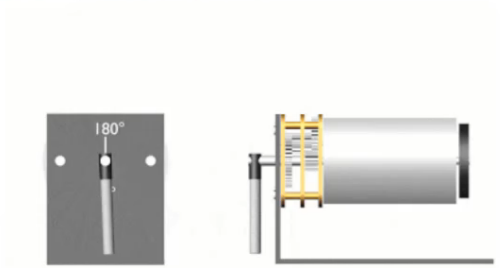
Cruise control

`CruiseControl.slx`



DC motor

`DCMotorControl.slx`



Inverted pendulum

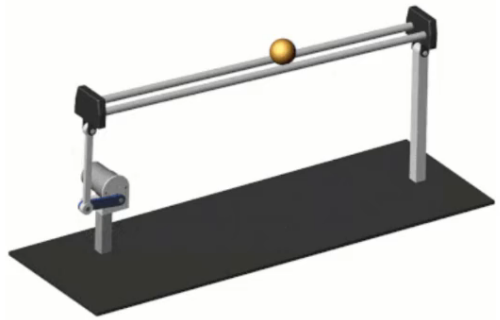
`InvertedPendulum.slx`

Rotary pendulum

`RotaryPendulum.slx`

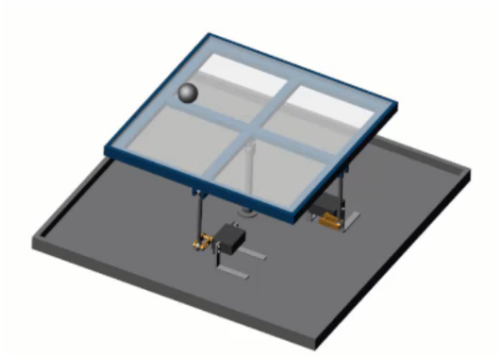
Ball and beam

`BallAndBeam.slx`



Ball and plate

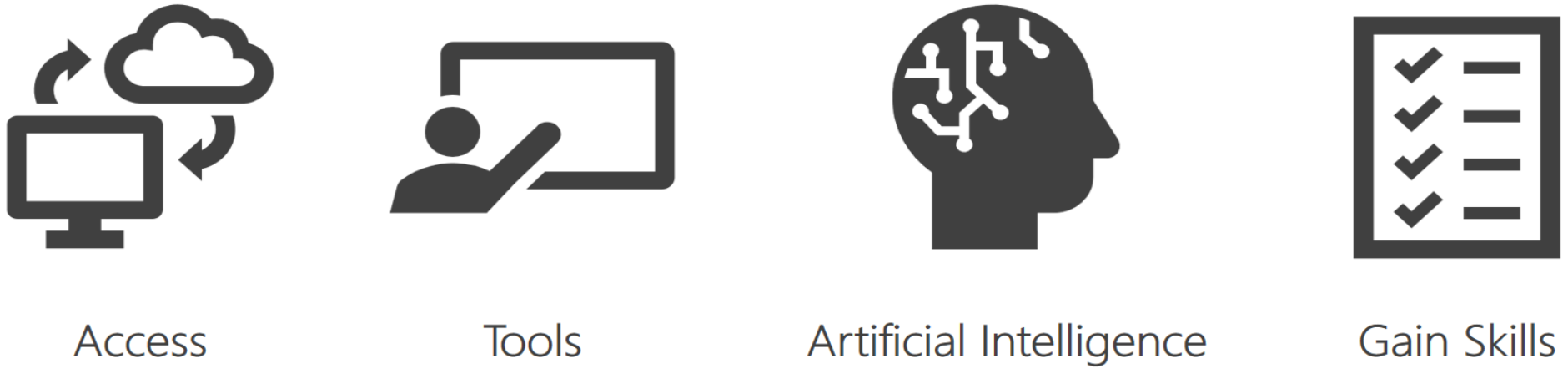
`BallAndPlate.slx`



https://www.mathworks.com/matlabcentral/fileexchange/100064-virtual-hardware-and-labs-for-controls

MathWorks

ACCESS | TOOLS | AI | GAIN SKILLS



Intelligent Control Systems

Computational Thinking Tools

https://drive.mathworks.com/sharing/006cb3c3-ad49-4f6a-b04c-3b42c3e79a51